

CLAIMS

What is claimed is:

1. A method for extending the life of a power supply that supplies power to motor in a power tool, comprising:
 using a pulse width modulation controller to supply voltage pulses of an initial width to the motor;
 changing the width from the initial width to an alternative width if a condition concerning a current associated with the motor is met.
2. The method of Claim 1, wherein the condition is when the current exceeds a first threshold.
3. The method of Claim 2, wherein the alternative width is shortened.
4. The method of Claim 1, wherein the condition is when the current falls below a first threshold.
5. The method of Claim 4, wherein the alternative width is lengthened.
6. The method of Claim 1, wherein the motor is a direct current motor.
7. The method of Claim 6, wherein the direct current motor is a permanent magnet direct current motor.
8. The method of Claim 1, wherein the pulse width modulation controller includes a power transistor.

9. The method of Claim 8, wherein the power transistor is a bipolar junction transistor.
10. The method of Claim 8, wherein the power transistor is a metal oxide semiconductor field effect transistor.
11. The method of Claim 8, wherein the pulse width modulation controller further includes a microprocessor.
12. The method of Claim 8, wherein the pulse width modulation controller further includes a ramp signal generator.

13. A power tool, comprising:
 - a housing;
 - a power supply disposed within the housing;
 - a motor disposed within the housing, the motor providing torque for the power tool; and
 - a pulse width modulation controller disposed within the housing for determining the amount of current supplied from the power supply to the motor.
14. The power tool of Claim 13, wherein the power supply includes a battery.
15. The power tool of Claim 13, wherein the pulse modulation controller includes a switch that supplies current to the motor when the switch is turned on.
16. The power tool of Claim 15, wherein the pulse modulation controller further includes a microprocessor that turns the switch on and off.
17. The power tool of Claim 16, wherein the pulse modulation controller further includes voltage measuring circuitry to determine a turn on time for the switch.
18. The power tool of Claim 17, wherein the voltage measuring circuitry measures battery voltage and motor voltage.
19. The power tool of Claim 18, wherein power tool further includes circuitry for speed control.
20. The power tool of Claim 19, wherein the circuitry for speed control includes a potentiometer.

21. The power tool of Claim 20, wherein the voltage measuring circuitry further measures a voltage across the potentiometer.
22. The power tool of Claim 15, wherein the pulse width modulation circuit further includes a ramp generator that provides a ramp signal.
23. The power tool of Claim 22, wherein the pulse width modulation circuit further includes a comparator that compares the ramp signal to a measured motor voltage to determine the pulse width modulation waveform.

24. An apparatus for limiting current to a load, comprising:
means for supplying power;
means for providing torque to a load; and
means for switchably supplying power to the means for providing torque from the means for supplying power, the means for switchably supplying power being actuated according to a pulse width modulation technique.
25. The apparatus of Claim 24, further comprising a means for monitoring power supplied by the means for supplying power and a means for monitoring current drawn by the means for providing torque to a load.
26. The apparatus of Claim 25, further comprising means for controlling the switchably supplying power.
27. The apparatus of Claim 26, wherein the means for controlling the switchably supplying power interprets data provided by the means for monitoring power supplied by the means for supplying power and interprets data provided by the means for monitoring current drawn by the means for providing torque to a load.
28. The apparatus of Claim 27, wherein the means for supplying power includes lithium ion batteries.
29. The apparatus of Claim 28, wherein the means for supplying power provides a direct voltage between 30 and 40 volts.